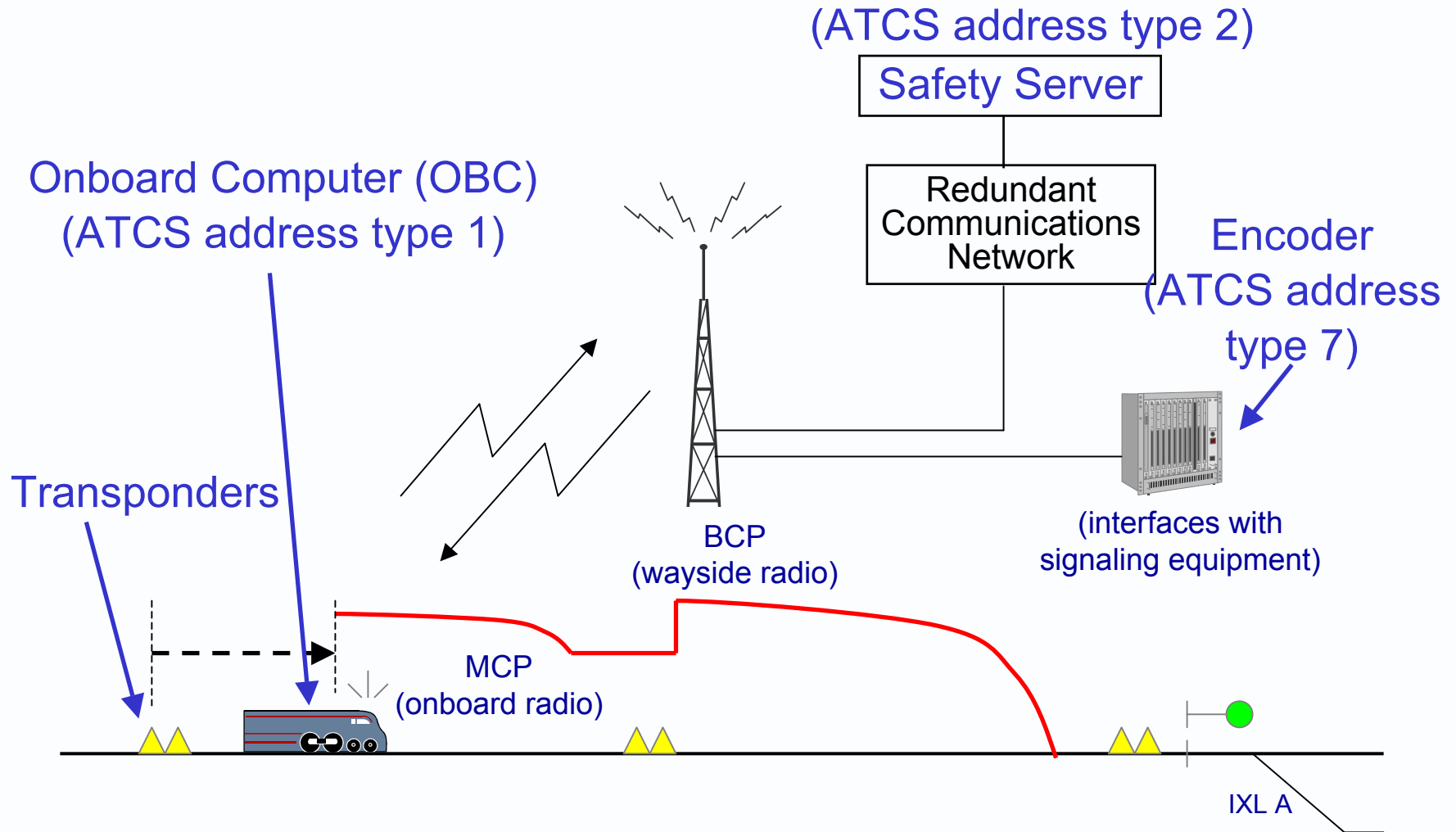# ACSES Overview
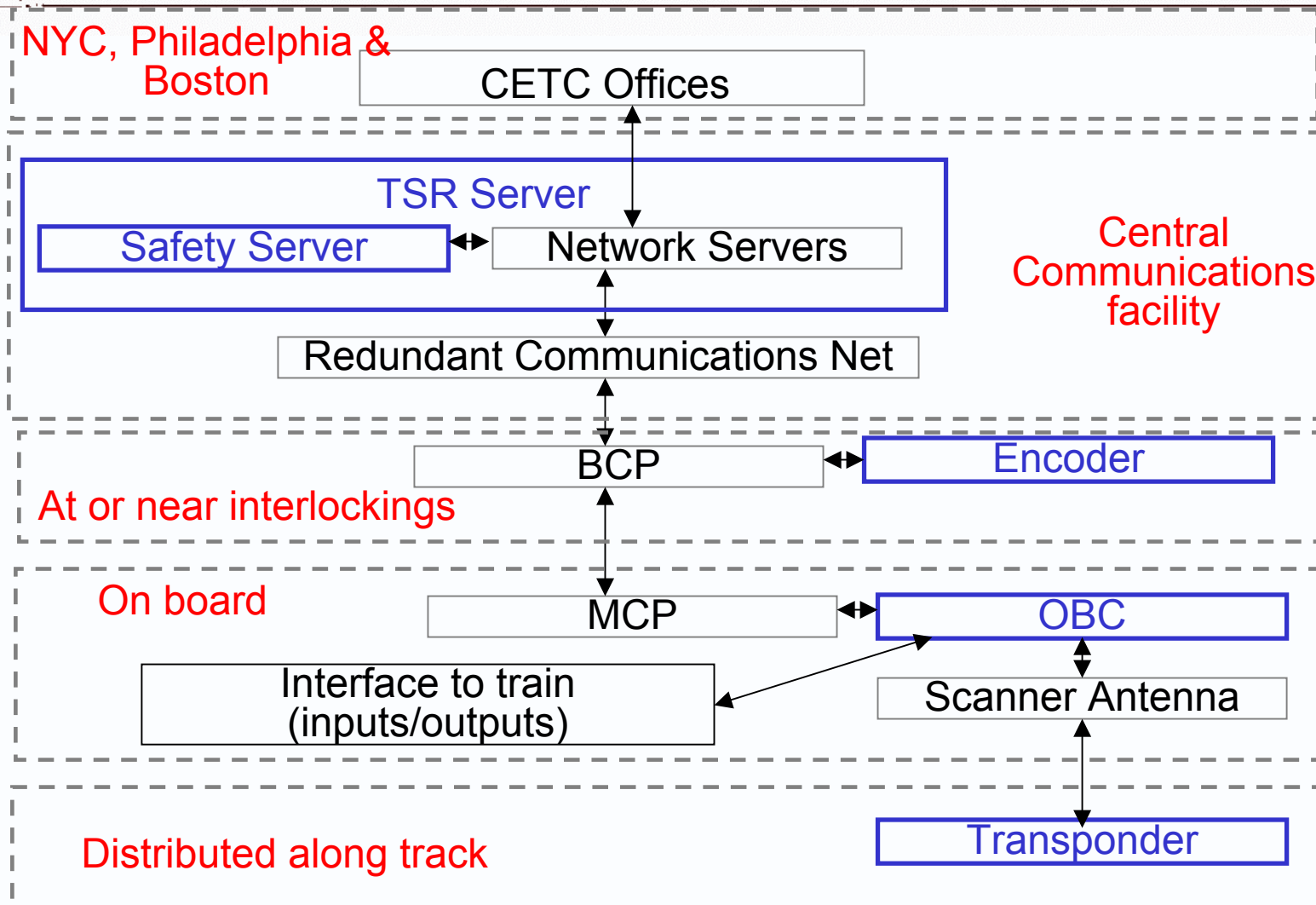
Fred Amyot

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● The PTC solution for the NEC:

– Upgrade of the cab signal to 9-Aspect.

– Selected ACSES (Advanced Civil Speed Enforcement System) to <u>augment</u> the cab signal and provide:

• Track or Civil speed restriction enforcement (PSR).

• Positive STOP at home signal enforcement (PTS) with radio release of the PTS. (PTSO).

• Enforcement of temporary speed restrictions (TSR).

– ACSES & Cab Signal operate <u>independently with minimal interaction.</u>
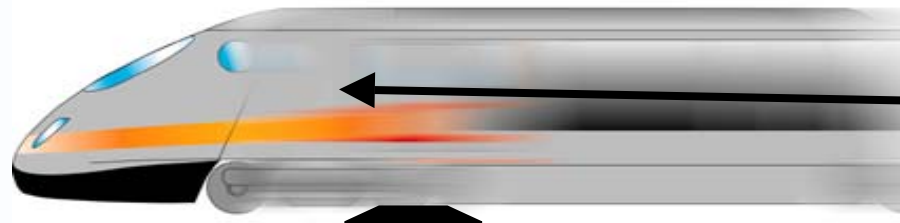
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(ATCS address type 2)

Safety Server

Redundant
Communications
Network

Onboard Computer (OBC)
(ATCS address type 1)

Encoder
(ATCS address
type 7)

Transponders

BCP
(wayside radio)

(interfaces with
signaling equipment)

MCP
(onboard radio)

IXL A

ACSES

ACSES Architecture

ALSTOM

NYC, Philadelphia & Boston

CETC Offices

Central Communications facility

TSR Server

Safety Server ◄► Network Servers

Redundant Communications Net

At or near interlockings

BCP ◄► Encoder

On board

MCP ◄► OBC

Interface to train (inputs/outputs)

Scanner Antenna

Distributed along track

Transponder
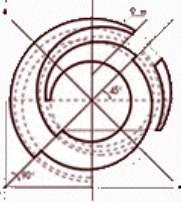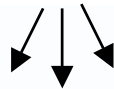
ACSES

Vital Onboard Computer (OBC)

Transponder reader
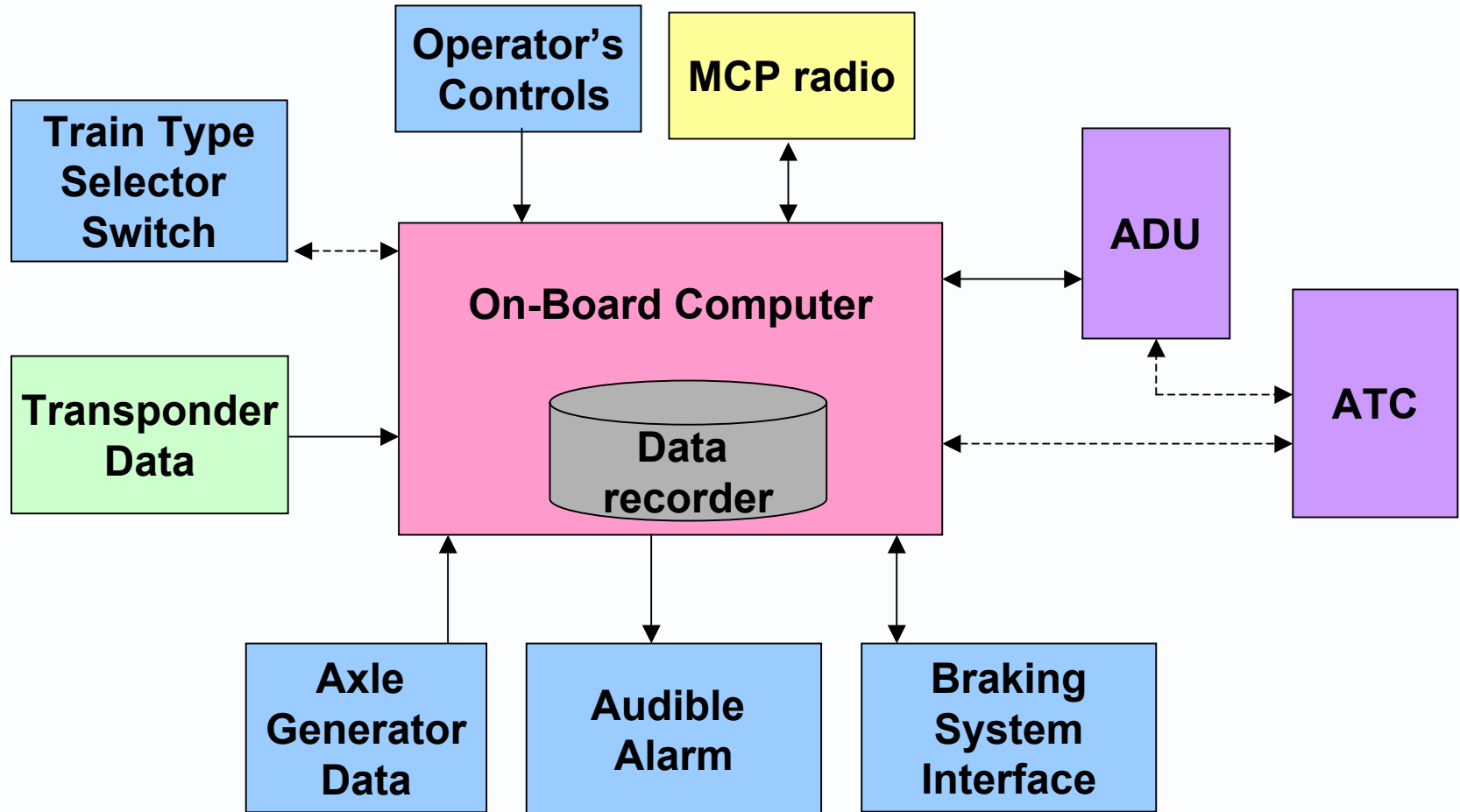
Passive (fixed) wayside Transponders

Core functionality data:
- Civil Speed data,
- Location of PTS target,
- Location data (line#, track#, etc.),
- Plus radio channel, address of wayside equipment, etc.

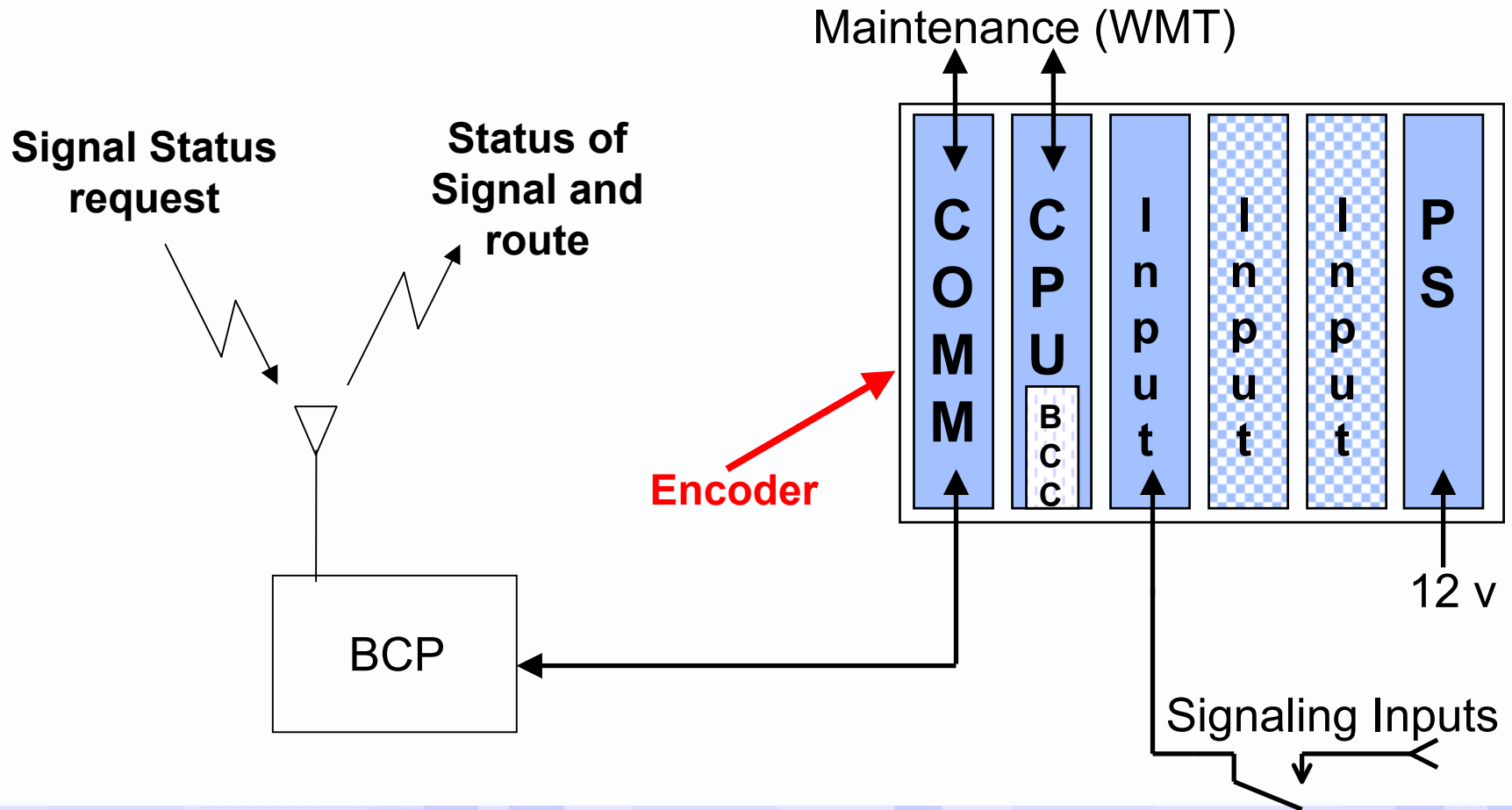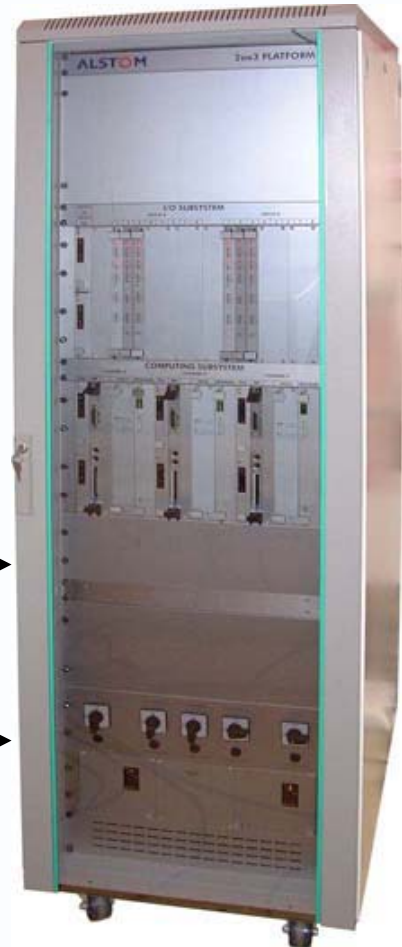The message contains a "large" CRC and other error detection bits)

ACSES

ALSTOM

● Vital Onboard Computer

ACSES

● Vital Encoders to provide status of the interlocking

Maintenance (WMT)

Signal Status request

Status of Signal and route

COMM

CPU

B C C

Input

Input

Input

PS

Encoder

12 v

BCP

Signaling Inputs

ACSES

● **Vital Safety TSR Server to manage Temporary Speed Restriction data**

Two out of Three (2oo3) Platform

To/From:
- Wayside Comms Controllers
- CETC offices

Network server - 1

Network server - 2

ACSES Equipment
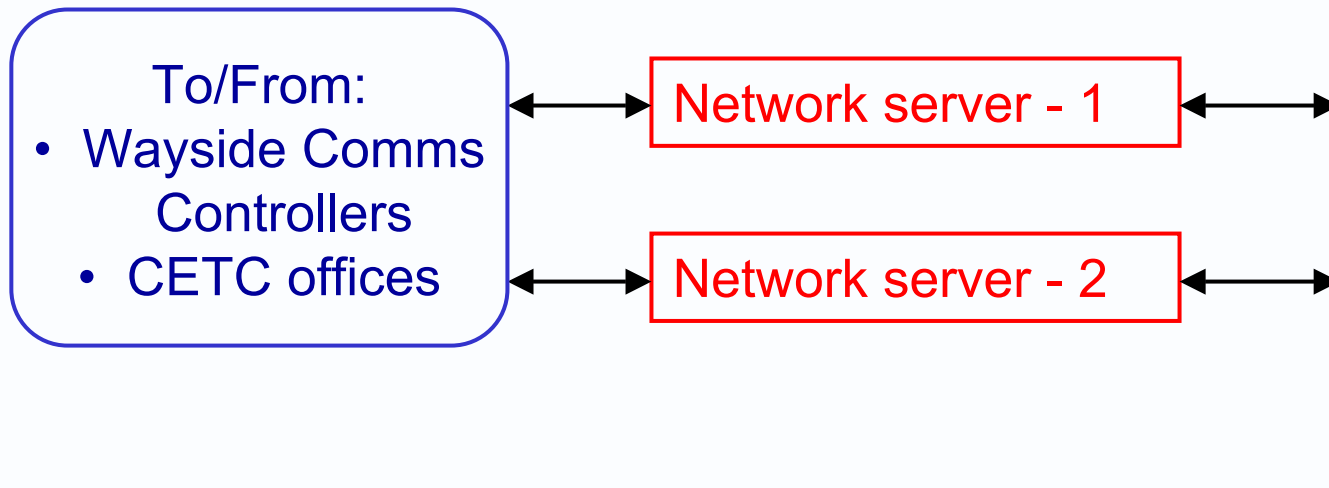
- **ATCS radios and <u>redundant</u> communications network**

Safety Server

From Encoder:
- Status of signal and route data

From Safety Server:
- Temporary speed data

Redundant Communications Network

OBC initiates requests for data

Sends maintenance messages.

BCP
(wayside radio)

Encoder
(interfaces with signaling equipment)

IXL A
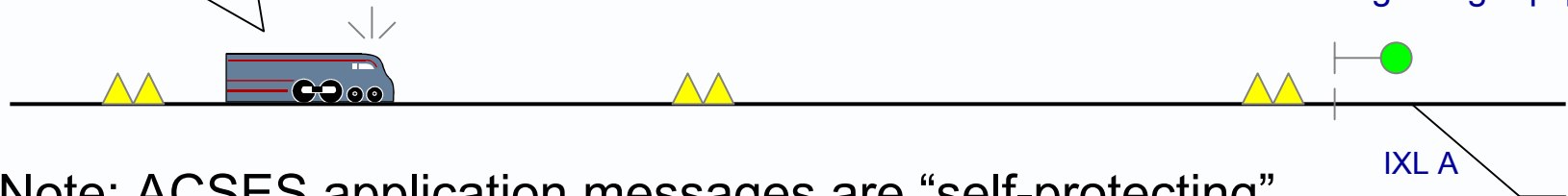
Note: ACSES application messages are "self-protecting".

ACSES

CETC Subsystem

CETC
New York

CETC
Boston

CETC
Philadelphia

◄──────── TCP/IP 100 base T ────────►

Ground Network Subsystem

Network
Management
System

TSR Server

Network Server 1 *	Safety TSR Server	Network Server 2 *

*Amtrak Supplied Rack

◄──── TCP/IP 10 base T ────►

Rack #1

HUB 1

WCC / FDP 1

Multiplexer   Multiplexer

DSU   DSU   DSU   DSU

Rack #2

HUB 2

WCC / FDP 2

Multiplexer   Multiplexer

DSU   DSU   DSU   DSU

DSU   DSU

Example
Wayside Layout

DSU   DSU

Note: 1-10 MUXs per WCC, 1-8 DSUs per MUX, and 1-x Line Drivers per BCP

A/B Switch

BCP

Line Driver 1   Line Driver X

Line Driver 1   Line Driver X

Encoder   Encoder

Transponder Transmission Subsystem and Carborne Subsystem

CTV   PSV1/UC20   OBC   MCP

Transponders

Carborne	Transponder Transmission	Ground Network	CETC	AMTRAK

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